Approximation of n!

If we would like to know the value of 100!, we would use Stirling's approximation to calculate the upper and lower bounds of n! as follow:

$$\sqrt{2\pi} \times n^{n+\frac{1}{2}} \times e^{-n+\frac{1}{12n+1}} < n < \sqrt{2\pi} \times n^{n+\frac{1}{2}} \times e^{-n+\frac{1}{12n}}$$

Lower bound of n!

Upper bound of n!

Your Task

Write a program that accepts an integer n to calculate the approximated lower and upper bound from the formula above.

Input

An integer n.

Output

The lower bound and the upper bound of n!.

Example

Input (from keyboard)	Output (on screen)
1	0.9958701614627972 1.0022744491822266
5	119.9698539592089 120.00263708619698
50	3.0414009534599554e+64 3.0414093877504934e+64
100	9.332615094728998e+157 9.332621570317666e+157